



# ***Cost and Software Data Reporting Training***

## Work Breakdown Structure (WBS) Module

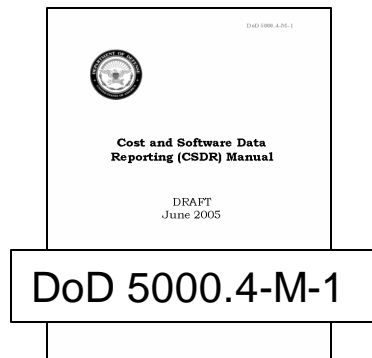
# Schedule

<b>DAY 1</b>	<b>DAY 2</b>	<b>DAY 3</b>
0800 Class Orientation	0800 Contract Planning	0900 Question /
0830 Background / Familiarization Module	0915 SRDR Planning (Part 1)	Answer Session
0945 Break	1015 Break	930 Validation (Part 1)
1000 WBS Module	1030 SRDR Planning (Part 2)	1015 Break
1130 Lunch	1130 Lunch	1030 Validation (Part 2)
1230 RAM Module	1230 Contracting	1130 Lunch
1330 Evolutionary Acquisition	1330 Cost Reporting (Part 1)	1230 SRDR Reporting
1430 Break	1500 Break	1400 Break
1445 Program Planning Module	1515 Cost Reporting (Part 2)	1415 Final Exam
		1615 Wrap-Up

# Lesson Assignment Sheet

- Objectives:
  - For students to know how to build an effective product-oriented Work Breakdown Structure
- Desired Learning Outcomes:
  - Be familiar with MIL-HDBK-881A WBS structures and definitions
  - Understand proper WBS formats, including parent/child relationships and WBS numbering
  - Be able to recognize key differences between product, process, and other types of WBS's
- Assignment:
  - EXERCISE 3-1. HOUSE WBS
- Reference Material:
  - CSDR Reference Book
    - MIL-HDBK-881A, *Work Breakdown Structures for Defense Material Items*, July 2005
    - Data Item Description D1-MGMT-81334A, *Contract Work Breakdown Structure*
  - CSDR Workbook
    - *Developing a Useable Work Breakdown Structure*, Neil F. Albert
    - *"Breaking Down" The Work Breakdown Structure*, James J. Clark, Philip D. Littrell, April 2002
    - *Systems Engineering Fundamentals – Chapter 9: Work Breakdown Structure*, DSMC, October 1999

# DoD 5000.4-M-1



- C3.5.6 Stakeholder Responsibilities.

*“In coordination with the CWIPT, **the DoD PM shall develop the WBS in accordance with the product-oriented structure in MIL-HDBK-881** (reference (d)) but can deviate from this guidance if justified by unique programmatic requirements. Based upon the advice of the CWIPT, the PM shall ensure that there is only one program WBS and one contract WBS for each contract. The program WBS submitted with the CARD shall agree with the program **CSDR Plan WBS** as noted in reference (c). Any differences must be identified and explained when the later of the two documents is submitted.”*

***Format and content requirements are provided in Data Item Description DI-MGMT-81334A, Contract Work Breakdown Structure***

# What is a WBS?

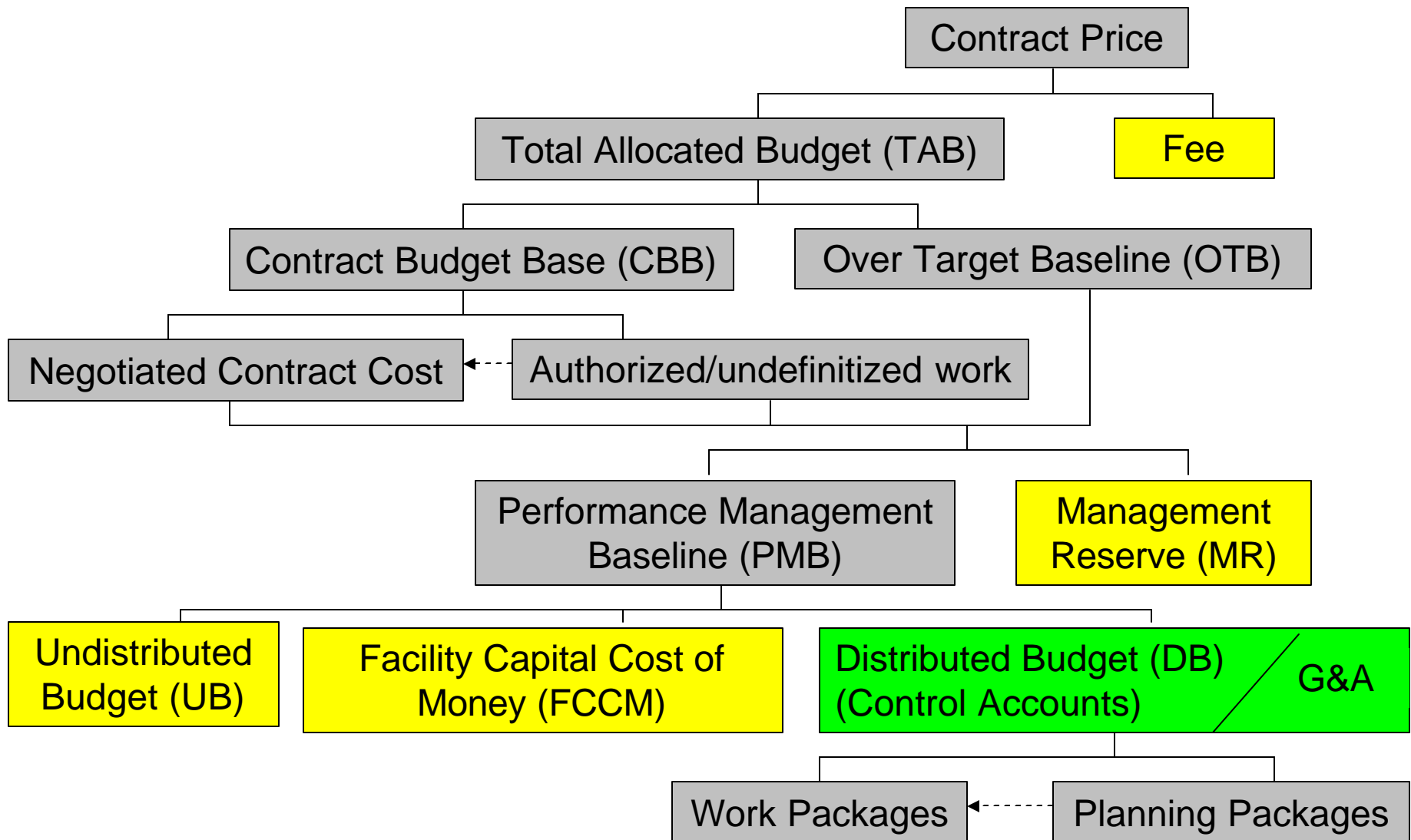
- A WBS is a **PRODUCT ORIENTED** family tree, composed of hardware, software, services, data and facilities.
  - *Results from System Engineering efforts during the acquisition of a Defense Material Item*
  - *Displays and Defines the Product(s) to be developed or produced and relates the elements of work to be accomplished to each other and to the end product*

# Applications of the WBS

- Technical Management
- Statement of Work
- Specification Tree
- Configuration Management
- Financial Management
- Contract Budgeting
- Cost Estimating
- Databases
- Others???

A product-oriented WBS is the most appropriate and effective framework to be used as a coordinating medium across *all* applications

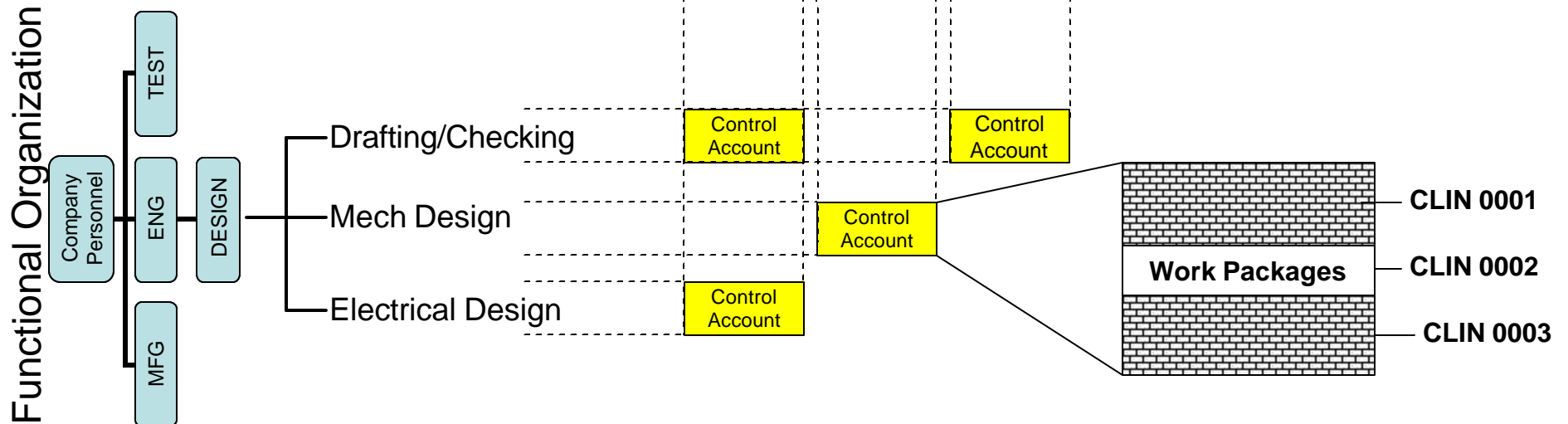
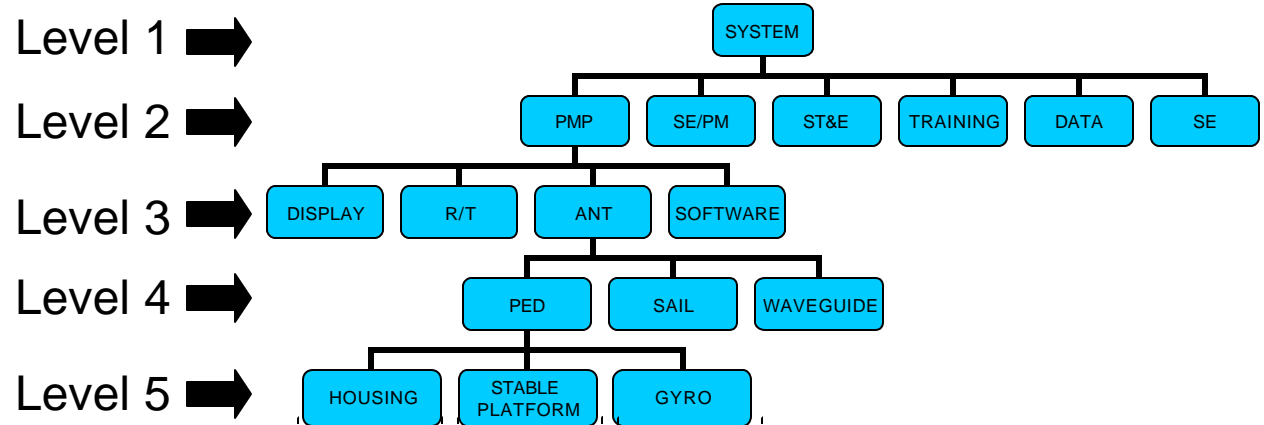
# WBS / Contract Relationship



# WBS/Contractor Control Account Interface

## *Ideal World...*

### Contract Work Breakdown Structure



6/1/2006



# WBS/Contractor Control Account Interface

## *Reality...*

### Missile Contract Plan WBS

### Contractor Internal WBS

10. WBS ELEMENT CODE		11. WBS
a. PROGRAM	b. CONTRACT	REPORTING ELEMENTS
1.0	1000	Cruise Missile X Missile System
1.1	1100	Air Vehicle (AV)
1.1.1	1110	Propulsion
	1111	Rocket Motor
	1112	Engine
	1113	Integration, Assembly, & Test
1.1.2	1120	Payload
	1121	Warhead Load
	1122	Target Detection Device
	1123	Fuze
	1124	Integration, Assembly, & Test
1.1.3	1130	Airframe
	1131	Nose Structure
	1132	Payload Structure
	1133	Midbody Structure
	1134	Aftbody Structure
	1135	Tailcone Structure
	1136	Wing Deployment Actuator
	1137	Wing Door Actuator
	1138	Integration, Assembly, & Test
1.1.4		Reentry System

Material Procurement

Midbody Design

Midbody Planning

Midbody Integration

Midbody Assembly Labor

Midbody Quality

⋮

*Contract Plan WBS may not exactly match the Contractor's Internal WBS*

# WBS Types

- **Program Work Breakdown Structure**

- Encompasses the entire program and consists of at least three levels of the program.
  - *Used by the Government Activity (CWIPT) to define the contract WBS.*
  - *Used by CWIPT to develop and extend a contract WBS.*

- **Contract Work Breakdown Structure**

- OSD CAIG approved WBS for reporting purposes and its discretionary extension by the contractor in accordance with Government direction.
  - *Includes all the elements for the products which are the responsibility of the contractor.*
  - *Contract work statements should provide the reporting requirements.*
  - *Common with WBS used in the CPR and IMS – see USD AT&L Memo dated 7 MAR 2005.*

# WBS Levels

- **Level 1**

- Entire Defense Materiel Item**

- PPBS Program Element, Project or Subprogram*

- **Level 2**

- Major Elements of Defense Materiel Item**

- Top Level Aggregations all Hardware and Software elements, Services, or Data*

- **Level 3**

- Subordinate Items to Level 2 Elements**

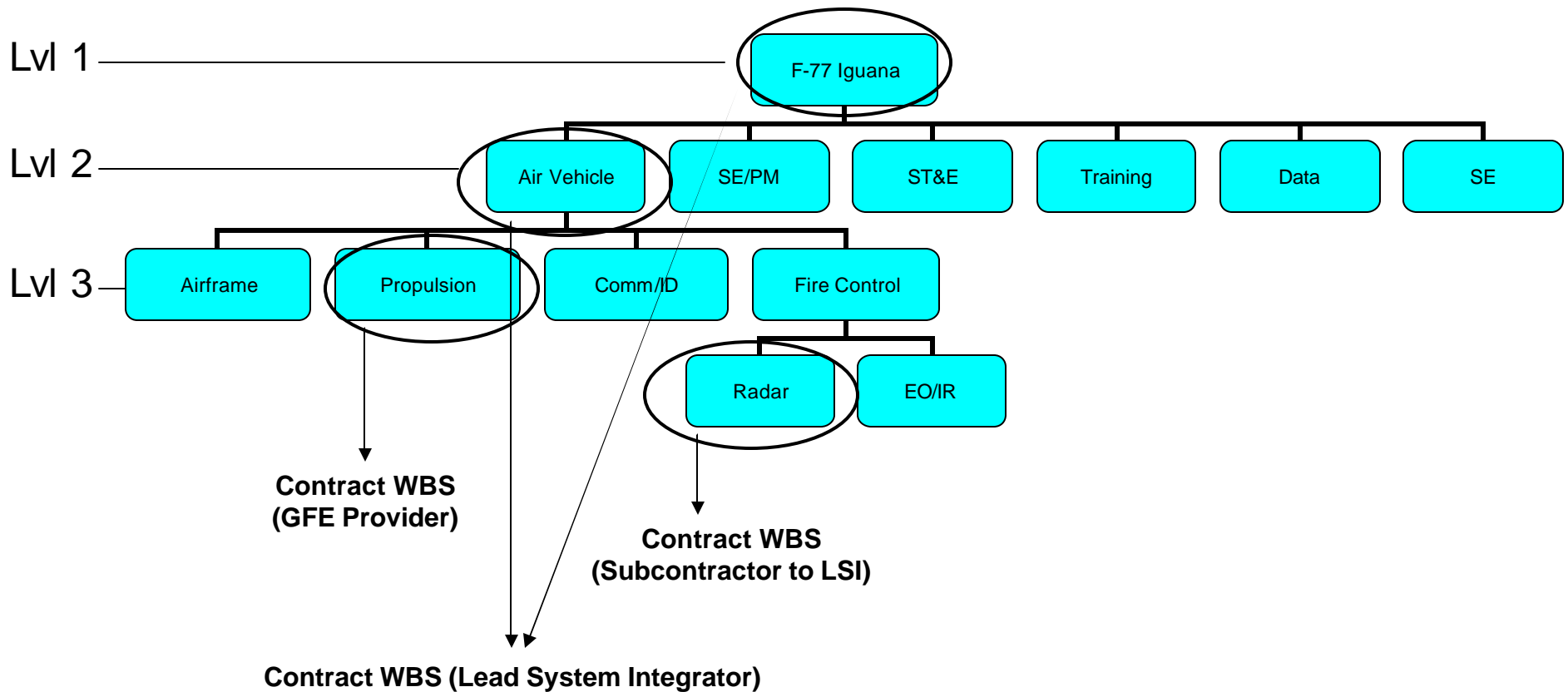
- Generally Common Across Similar Programs*

# Common WBS Elements

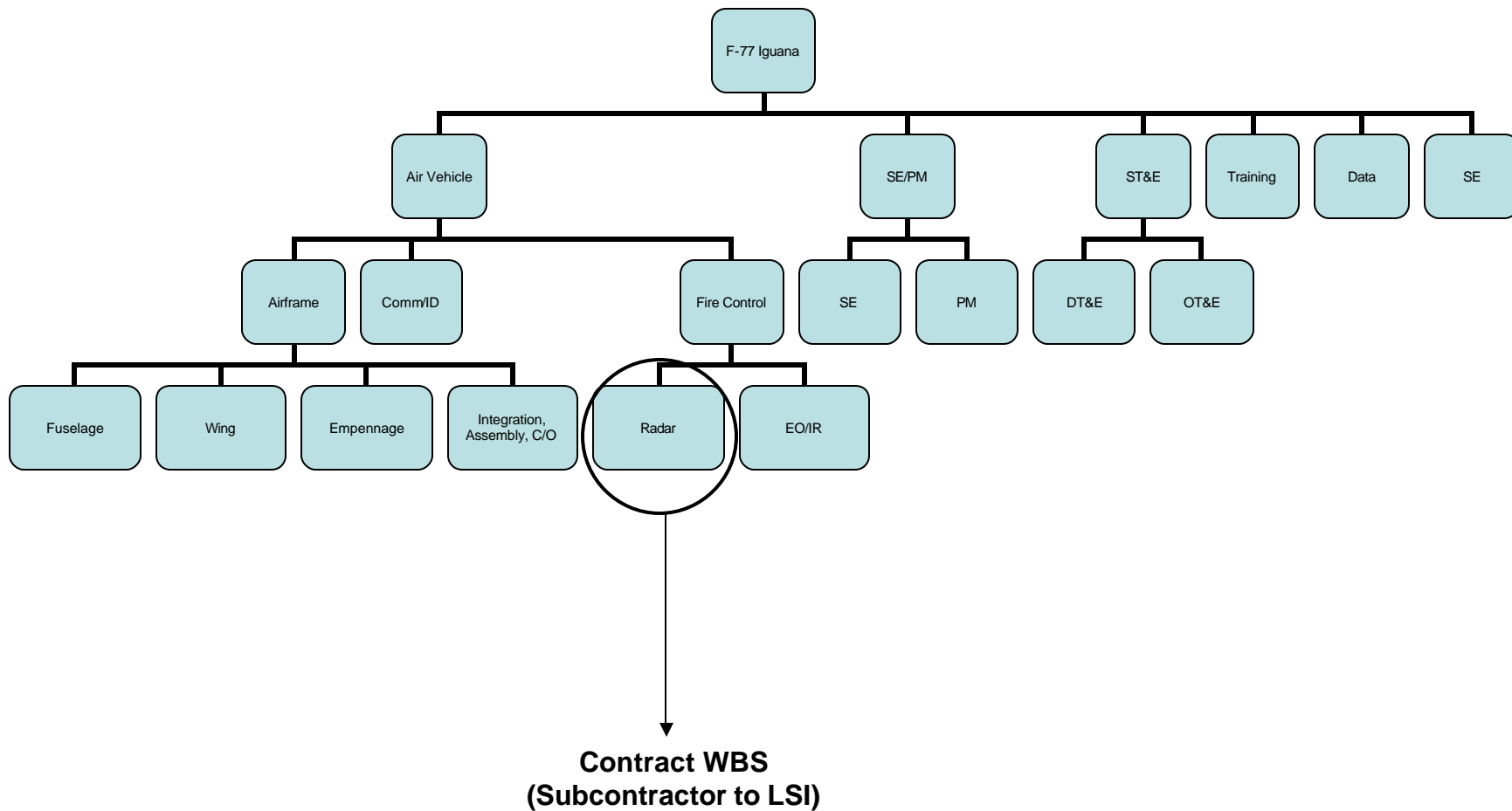
- **Applicable to all types of systems**
  - *Systems Engineering/Program Management*
  - *System Test and Evaluation*
  - *Training*
  - *Data*
  - *Peculiar Support Equipment*
  - *Common Support Equipment*
  - *Operational/Site Activation*
  - *Industrial Facilities*
  - *Initial Spares and Repair Parts*

# Program WBS/Contract WBS Interface

## (Program Plan WBS)



# Contract WBS



# MIL-HDBK-881A Appendices

- 8 System Types
  - Aircraft
  - Electronic/Automated Software Systems
  - Missile Systems
  - Ordnance Systems
  - Sea Systems
  - Space Systems
  - Surface Vehicle Systems
  - Unmanned Air Vehicle Systems

+

- Common Elements

# Building the WBS

- **The Government activity is responsible for building/maintaining the program WBS**
- **Iterative evolution involving the analysis of:**
  - Program objective
  - Functional design criteria
  - Program scope
  - Technical performance requirements
  - Proposed methods of performance
  - Procurement strategy
    - Prime/subcontract relationship
    - Make vs. buy plan
  - Drawings
  - Process flow charts
  - Other technical documentation

*Much of this information can be found in the program's Cost Analysis Requirements Document (CARD)*



# CARD

- Document produced by the PM that is intended to “establish, as a basis for cost-estimating, a description of the salient features of the program and of the system being acquired”

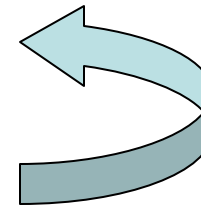
- Contents of the CARD are prescribed by DOD 5000.4-M

- 1.0 **System Overview**
- 2.0 Risk
- 3.0 System Operational Concept
- 4.0 Quantity Requirements
- 5.0 System Manpower Requirements
- 6.0 System Activity Rates
- 7.0 System Milestone Schedule
- 8.0 **Acquisition Plan and/or Strategy**
- 9.0 System Development Plan
- 10.0 Element Facilities Requirements
- 11.0 Track to Prior CARD
- 12.0 **Contractor Cost Data Reporting (CCDR) Plan**

*Should contain System Configuration, GFE, and Technical Description information*

*Should identify contractor and subcontractor relationships*

The CSDR plan does not exist until  
**AFTER** the WBS has been developed!



# Preparing the WBS

- **Begin with the appropriate MIL-HDBK-881A WBS and expand the high risk, high technical interest areas.**
  - MIL-HDBK-881A facilitates *consistent and comparable* data reporting
  - *Gather information from program documents such as the CARD, as well as the program's technical experts*
- **Avoid non-product oriented elements:**
  - *Design engineering, requirements analysis, tooling*
  - *Production, RDT&E*
  - *Rework, retesting, refurbishing*
  - *Non-recurring, recurring*
  - *Organization structures (e.g., IPTs)*
- **Avoid single children elements (i.e., parent elements should always have at least two children)**
- **Use *specific* terms wherever possible (i.e., actual system names/nomenclature)**
  - **Avoid acronyms – spell out all terms (an acronym familiar to you may not be familiar to someone else trying to use your WBS.)**

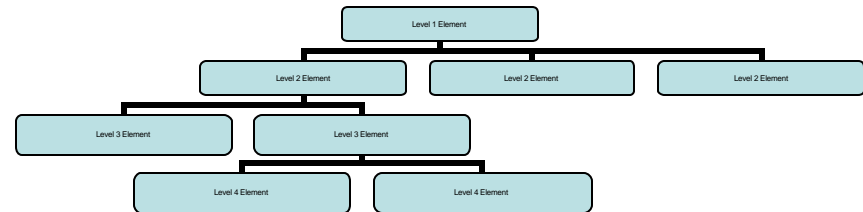
***Don't lose sight of the overall objective of the CSDR process: to obtain valid, well-defined, historical cost data reports for the purpose of aiding in the development of life cycle estimates for future (and current) programs.***

# Preparing the WBS

- Define the WBS level of reporting to use the fewest number of elements consistent with the anticipated use of the data
- Detailed reporting required for lower level elements that address high-risk, high-value or high-technical-interest areas of the program
- Extensions to Contract Plan WBS can be tailored to the specific program but will be consistent and tractable with the Program WBS and MIL-HDBK-881A

# Preparing the WBS

- *Use of a “tree” format may aid in visualizing the WBS, however, for documentation purposes, a list format is preferred.*



- *The WBS in list format should be properly indented and include a logical numbering scheme*
  - *Level 1: 1.0*
  - *Level 2: 1.1*
  - *Level 3: 1.1.1*

**Example: 1.3.5**

**Third Level 2  
element listed**

**Fifth Level 3 element  
listed under the third  
Level 2 element**

1.0	<b>Aircraft System</b>
1.1	<b>Air Vehicle (AV)</b>
1.1.1	Airframe
1.1.2	Propulsion
1.1.3	AV Applications Software
1.1.4	AV System Software
1.1.5	Communications/Identification
1.1.6	Navigation/Guidance
1.1.7	Central Computer
1.1.8	Fire Control
1.1.9	Data Display and Controls
1.1.10	Survivability
1.1.11	Reconnaissance
1.1.12	Automatic Flight Control
1.1.13	Central Integrated Checkout
1.1.14	Antisubmarine Warfare
1.1.15	Armament
1.1.16	Weapons Delivery
1.1.17	Auxiliary Equipment
1.1.18	Crew Station
1.2	Sys Engineering/Program Management
1.3	System Test and Evaluation
1.3.1	Development Test and Evaluation
1.3.2	Operational Test and Evaluation

# Preparing the WBS

- Prepare ***PRIOR*** to draft RFP release
- The RFP should include:
  - *Notional CWBS (prepared by the government)*
  - *Notional CWBS Dictionary (prepared by the government)*
- The contractor should be instructed in the RFP to extend the CWBS to a lower level of detail in order to provide visibility into critical items
- Contractor may suggest changes to the notional CWBS as part of the RFP response, however, these changes will be discussed/negotiated with the government

***Note: Reference Module #9 (Contracting) of this training course for more information.***

# WBS Dictionary

- Lists and defines the WBS elements
  - Definitions match directly (one-for-one) to the WBS
  - Provides a physical end-item description
- Describes resources and processes required
- Provides linkages to the detailed technical definition documents
- Maintained throughout the life of the program
  - Revised to reflect program changes
- Guidance provided by Data Item Description DI-MGMT-81334A, Contract Work Breakdown Structure

# WBS Dictionary

- ***The government activity develops/maintains/updates the dictionary for the Program WBS***
- ***The contractor develops the dictionary for the contract WBS***
- ***Typical Format:***

CONTRACT WORK BREAKDOWN STRUCTURE DICTIONARY		PROGRAM: Missile X LRIP Surface-to-Air Interceptor	RFP NO: _____ CONTRACT NO: XXXXX-98-C-XXXX	DATE: 11/1/00
CWBS CODE	CWBS ELEMENT	CWBS DEFINITION		
1.0	Missile System	The missile is a cylindrical body with four fixed fins attached to the aft end of the Solid Rocket Motor case. The control surfaces are located behind the fixed fins. The missile angular orientation is zero degrees at top center, with increasing angles positive in a clockwise direction (standing at the aft end looking forward). The outside surface of the missile body is coated for thermal protection of the structure from aerodynamic heating and rain erosion. Electrical interface between the launcher and the missile is provided by an umbilical cable connecting the missile Aft-Section to the Aft-Section of the Canister.		
1.1	Air Vehicle	This element refers to the means for delivering the destructive effect to the target, including the capability to generate or receive intelligence to navigate and penetrate to the target area and to detonate the warhead. This element includes the design, development, and production of complete units (prototype and operationally configured units, which satisfy the requirement of their applicable specifications(s)) regardless of their use.		
1.1.1	Propulsion	The propulsion system consists of the booster and the interstage. A single-stage, solid propellant rocket motor provides all of the boost impulse for the missile. The deployable flares and aft rate gyro package (RGP) are positioned at the aft end of the booster in the BUG configuration.		
1.1.2	Airframe	This element refers to the structural framework that provides the aerodynamic shape, mounting surfaces and environmental protection for the missile components. It includes the wings, fins, and structural body		

# PRACTICAL EXERCISE

## 45 MINUTES

- *Using the materials provided, complete the WBS exercise*



# Questions / Discussion / Review

- **At this point, you should:**
  - *Be familiar with MIL-HDBK-881A WBS structures and definitions;*
  - *Understand proper WBS formats, including parent/child relationships and WBS numbering;*
  - *Be able to recognize key differences between product, process, and other types of WBS's*

# For more information...

- **Read:**
  - **CSDR Reference Book**
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